

REMARKS

This paper responds to the Office Action mailed on February 11, 2008.

Claims 8, 13, 16 and 24 are amended, no claims are canceled, and no claims are added; as a result, claims 8-53 are now pending in this application.

Applicants bring to the attention of the Examiner the Final Office Action mailed on December 13, 2007 and the Final Office Action mailed on April 2, 2008 for U.S. Application No. 10/744,632 (Attorney Reference No. 303.853US1), which is assigned to Examiner Rick Kiltae Chang.

Applicants bring to the attention of the Examiner the response to the Final Office Action filed on December 13, 2007 and the response to the Final Office Action filed on March 13, 2008 for U.S. Application No. 10/744,632 (Attorney Reference No. 303.853US1), which is assigned to Examiner Rick Kiltae Chang.

§103 Rejection of the Claims

Claims 8-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,669,801 to Yoshimura, *et al.* (hereinafter, “the Yoshimura reference”) in view of U.S. Patent No. 6,211,488 to Hoekstra, *et al.* (hereinafter, “the Hoekstra reference”) and further in view of U.S. Published Application No. 2003/0006795A1 to Asayama, *et al.* (hereinafter, “the Asayama reference”). Claims 9, 15, 18 and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Yoshimura reference in view of the Hoekstra reference, and further in view of U.S. Patent No. 6,611,540 to Mueller (hereinafter, “the Mueller reference”). Claims 11 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Yoshimura reference in view of the Hoekstra reference, and further in view of U.S. Patent No. 3,691,707 to Von Arx, *et al.* (hereinafter, “the von Arx reference”). Claims 17 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Yoshimura reference in view of the Hoekstra reference, and further in view of U.S. Patent No. 6,008,069 to Yamada (hereinafter, “the Yamada reference”). Applicants disagree with the stated grounds of rejection and desire to further clarify various distinctions of the present invention over the cited art. Reconsideration of the present application is therefore requested in light of the present amendment and following remarks.

In the following discussion, the disclosed embodiments of the invention may be discussed in comparison to the prior art. It is understood, however, that any discussion of the disclosed embodiments, as well as any discussion of the differences between the disclosed embodiments of the present invention and the prior art do not define the scope or interpretation of any of the claims. Instead, such discussed differences, if presented, are offered merely to help the Examiner appreciate important claim distinctions as they are discussed.

The Examiner has cited the Yoshimura reference as pertinent to the patentability of claims in the present application. Specifically, the Examiner has cited the Yoshimura reference for disclosing the formation of scribe lines on a wafer with a laser, and cutting the wafer at the scribe lines using a mechanical sawing operation. The Yoshimura reference fails to disclose, or suggest the application of a coolant to the substrate to reduce a thermal effect on the substrate that results from a cutting operation.

The Examiner has further cited the Hoekstra reference for "...locating a coolant stream adjacent the scribe beam..." (Office Action at page 3). Applicants note, however, that the Hoekstra reference discloses a substrate separation method that uses laser energy directed at the substrate and a fluid cooling stream to initiate a micro-crack formation in the substrate that extends partially into the thickness of the substrate. The substrate is then separated along a selected micro-crack to provide a plurality of separated portions of the substrate.

The Examiner has cited column 4, lines 25-31 in the Hoekstra reference for disclosing the presence of a coolant stream adjacent a scribing beam. Specifically, the Hoekstra reference teaches *inducing a temperature differential* adjacent the scribing beam in order to *propagate* the micro-crack along and through the substrate. Accordingly, Applicants understand the Hoekstra reference to fairly teach *exacerbating* a thermal effect on the substrate in order to promote the micro-crack propagation.

The Examiner has also cited the Asayama reference for disclosing various dimensional variations in a wafer dicing process. In particular, the Examiner has cited paragraph [0078] in the Asayama reference, which discloses, in pertinent part, a cutting blade having a width of about 50 microns, and a scribe width of about 100 microns.

With reference now to the claims, differences between the claim language and the applied references will be specifically pointer out. Claim 8, as amended, recites in pertinent part: "A

method for dicing workpieces, comprising...directing a coolant onto the scribe *to reduce a thermal effect on the workpiece...*". (Emphasis added). The cited combination of references does not disclose or fairly suggest this. In particular, and with reference to the Hoekstra reference, Applicants submit that the Hoekstra reference teaches promoting a thermal effect in the substrate by providing a coolant that causes micro-crack propagation in the substrate. Applicants therefore submit that the Hoekstra reference *teaches away* by causing a strong temperature differential to arise in the substrate. Claim 8 is therefore allowable over the cited combination of references. Claims depending from claim 8 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Claim 13, as amended, recites in pertinent part: "A method for dicing workpieces, comprising...providing a coolant to a surface of the workpiece proximate to the scribe *to reduce a thermal effect on the workpiece...*". (Emphasis added). Again, the cited combination of references does not disclose or fairly suggest this. Claim 13 is therefore allowable over the cited combination of references. Claims depending from claim 13 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Claim 16, as amended, recites in pertinent part: "A method for dicing workpieces, comprising...locally cooling a surface of the workpiece by providing a coolant proximate to the scribe *to reduce a temperature effect on the workpiece...*". (Emphasis added). The cited art, which includes the Hoekstra reference, simply does not disclose or suggest this. Applicants maintain that the Hoekstra reference *teaches away* from the present method by promoting a temperature differential in the substrate rather than reducing a temperature effect on the substrate. Claim 16 is allowable over the cited combination of references. Claims depending from claim 16 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Finally, claim 24, as amended, recites in pertinent part: "A method for dicing an integrated circuit substrate, comprising...cooling the scribe *by providing a coolant proximate to the scribe to reduce a thermal effect on the workpiece...*". (Emphasis added). Again, the cited art, when considered separately, or in combination, fails to disclose or suggest this. Claim 24 is

allowable over the cited combination of references. Claims depending from claim 24 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

The Examiner has further applied the Mueller reference for disclosing various laser duty cycles and power levels applicable to industrial lasers. The Von Arx reference has also been cited for disclosing cutting a wafer with a diamond nickel saw. Finally, the Yamada reference is cited for disclosing a rotary blade feed rate of about 100 millimeters per second.

With respect to the Examiner's rejection of claims 9, 15, 18 and 27, Applicants submit that the Mueller reference fails to provide the teaching missing from the asserted combination of the Yoshimura reference, the Hoekstra reference, and the Asayama reference, as discussed in detail above.

Further, with respect to the rejection of claims 11 and 20, Applicants submit that the Von Arx reference also fails to provide the teaching missing from the asserted combination of the Yoshimura, the Hoekstra, and Asayama references.

Finally, with reference to the rejection of claims 17 and 26, Applicants submit that the Yamada reference also fails to provide the teaching missing from the asserted combination of the Yoshimura reference, the Hoekstra reference and the Asayama reference.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

NEO C. PENG ET AL.

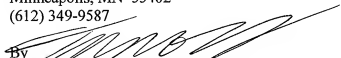
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12 May '08

By



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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 12th day of May 2008.

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